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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003904913 for a patent by ARON JOSEPH CLARKSON as filed on 09 September 2003.

WITNESS my hand this  
Nineteenth day of August 2004

JULIE BILLINGSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES



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AUSTRALIA

**Patents Act 1990**

**ARON JOSEPH CLARKSON**

**PROVISIONAL SPECIFICATION**

*Invention Title:*

***Dispensing Closure***

The invention is described in the following statement:

## DISPENSING CLOSURE

This invention relates to a dispensing closure for containers and relates particularly to a dispensing closure which is adapted to engage a container and facilitate dispensing of a material, such as a liquid, solid, powder or granular material, into the container.

The invention will be described with particular reference to a cap for a liquid container, such as a beverage container. However, it will be appreciated that the principals of the invention will be able to be applied to other container closures to enable two or more materials to be separated up to the moment of use and to then dispense at least one of the materials into another. Thus, the invention is applicable to dispensing pharmaceuticals in liquid, powder, tablet or granule form into an appropriate medium for ingestion of the pharmaceutical, colour pigments, in liquid or powder form or in capsules, into base paint carriers, cosmetic colouring material into a carrier, chemicals, including catalysts and hardeners, into an active ingredient, food flavouring, colouring, sweeteners or other food product into an appropriate beverage medium or the like, or any other combination of materials where it is necessary or desirable to selectively dispense one material or substance into another.

A number of proposals have previously been made for containers to be constructed in a way that two products are maintained separated until the moment of use at which time one product is admixed with the other in the container. Containers of this type have been proposed with closures which are used to effect the product separation and facilitate the introduction of one product into the other. However, the containers and closures previously proposed are relatively complicated. For example, in one proposal, a closure is formed of three parts, a first part including a compartment to hold one product, the compartment being adapted to engage in the neck of a container, a second part which moves relative to the first part and has a means for opening a bottom wall of the compartment to release the first product into the container, and a sealing cap which engages over the compartment and second part to seal the closure on the container.

Such a structure is relatively complicated and expensive to manufacture, requires the assembly of three separate parts as well as introduction of a product into the compartment during assembly, and necessarily involves a number of separate actions in order to release the product in the compartment into the container.

In another proposal as outlined in Patent GB2012714, a container is disclosed having an inner wall which divides the container into two compartments. An upper

compartment contains a piercing device that is moveable by pressure applied to a top wall to cause a tip of the piercing device to pierce a hole in the dividing wall. However, this structure requires a moveable top wall and is, therefore, susceptible to accidental actuation.

5 It is therefore desirable to provide an improved dispensing closure for containers which obviates at least some of the disadvantages of previously proposed dispensing closures.

It is also desirable to provide a dispensing closure for containers whereby a material or substance in liquid, powder, solid, granular or other form is able to be  
10 quickly and easily dispensed into the product in the container on which the closure is attached.

It is also desirable to provide a dispensing closure for containers which is relatively easy to produce, assemble and use.

It is also desirable to provide a dispensing closure for a variety of container  
15 types, including beverage containers, paint containers, cosmetic containers and others.

It is also desirable to provide a dispensing closure which may be adapted for a variety of different products to be dispensed into the container on which the closure is mounted.

According to one aspect of the invention there is provided a dispensing closure  
20 to dispense at least one product into a container, the closure including a container closure body adapted to sealingly engage with a neck of the container, the body having securing means to secure the closure to the container neck, a compartment to contain the at least one product to be dispensed, the compartment being adapted to fit within the container neck and being defined by a side wall, a top wall and a frangible bottom  
25 wall, and cutting means moveable relative to the side wall and the bottom wall to break open the frangible bottom wall of the compartment to selectively dispense contents of the compartment into the container.

In one form of the invention, the closure body includes an outer, cylindrical wall and a coaxial inner wall. The outer wall is provided with internal threads adapted to  
30 threadingly engage the threaded neck of a container to which the closure is to be fitted. The inner wall engages within the container neck, and the compartment fits within the inner wall. The upper end of the compartment is formed with a radially outwardly extending flange having reversely formed shoulders to engage corresponding shoulders on the closure body. In this way, the two parts of the closure are able to be snap-fitted  
35 together so that the compartment is able to rotate about its axis relative to the body. In this embodiment, the inner wall of the body carries a cutting knife edge which is

inwardly and upwardly turned towards the frangible bottom wall of the compartment. The bottom wall of the compartment extends at an angle to a plane perpendicular to the axis such that, in first assembled position, the bottom wall does not contact the knife. On relative rotation of the compartment, however, the frangible bottom wall is brought 5 into contact with the knife which cuts and breaks the wall from the compartment permitting contents thereof to be dispensed into the container to which the closure is fitted.

In another embodiment of the invention, the compartment and closure body are integral and are engaged with a cylindrical band which fits over the wall of the 10 compartment. The band carries the cutting knife which operates in the manner described above.

Preferably, the container closure body includes, on the lower end of the outer wall, a tamper proof evidence release band to provide any indication of tampering with the closure prior to its use.

15 According to another aspect of the invention there is provided a dispensing device for dispensing product into a container, the device having a sealed compartment containing the product, the compartment having a substantially cylindrical side wall, a frangible bottom wall and a top wall, the compartment being adapted to fit within a neck of the container, the device further having an outer wall to engage an outer surface 20 of the container neck and including securing means to secure the device to the container, and cutting means adapted to be rotated relative to the frangible bottom wall, the cutting means and/or the frangible bottom wall being arranged such that the relative movement causes the cutting means to break open the frangible bottom wall of the compartment to selectively dispense contents of the compartment into the container.

25 The cutting means may extend from a separate cylindrical band coaxial with the side wall of the compartment but rotatable relative thereto. Alternatively, the compartment and outer wall may be separate integers with the cutting means extending from an intermediate wall located between the compartment and the inner surface of the neck of the container.

30 According to a further aspect of the invention there is provided a method of dispensing at least one product into a container, the method including the steps of assembling a compartment containing a product to be dispensed with a closure body, engaging the assembled closure with a neck portion of a container into which the contents are to be dispensed, providing a cutting knife adjacent a bottom wall of the 35 assembled closure, and rotating the knife relative to the bottom wall to cause the knife

to cut into the bottom wall to thereby release the contents of the compartment into the container.

According to a further aspect of the present invention there is provided a cutting knife for use with a dispensing closure, the knife being integrally moulded with a wall 5 of the closure, the knife having at least two cutting edges extending at an acute angle to each other.

In order that the invention is more readily understood, embodiments thereof will now be described with reference to the accompanying drawings wherein:

Figure 1 is a cross sectional, elevational view of a first embodiment of the 10 invention;

Figure 2 is a cross sectional, elevational view of a second embodiment of the invention;

Figure 3 is a cross sectional, elevational view of a third embodiment of the invention;

15 Figure 4 is a cross sectional, elevational view of a fourth embodiment of the invention;

Figure 5 is a cross sectional, elevational view of a fifth embodiment of the invention;

20 Figure 6 is a cross sectional, elevation view of a sixth embodiment of the invention;

Figure 7 is a cross sectional, elevation view of a seventh embodiment of the invention;

Figure 8 is a cross sectional, elevation view of an eighth embodiment of the invention;

25 Figure 9 is a cross sectional, elevation view of a ninth embodiment of the invention;

Figure 10 is a perspective view of a modified form of compartment in accordance with another embodiment of the invention;

30 Figure 11 is a perspective view of a further modified form of compartment in accordance with a further embodiment of the invention;

Figure 12 is an enlarged elevational view of one embodiment of cutting knife in accordance with the invention; and

Figure 13 is a perspective view of a further embodiment of the present invention.

Referring to the drawings, Figure 1 illustrates a first embodiment of the invention in which a dispensing closure 15 has a compartment 16 defined by a cylindrical side wall 17, a top wall 18 and a frangible bottom wall 19.

The height of the side wall 17 varies around the perimeter of the compartment 5 16 so that the bottom wall 19 extends at an angle to a plane perpendicular to the axis of the cylindrical side wall 17.

The closure of this embodiment includes a closure body 21 which comprises an outer side wall 22 and an intermediate wall 23. The outer side wall 22 is provided with internal threads 24 that engage with corresponding threads on the neck of a container 10 (not shown) to which the closure is to be fitted. When fitted to the neck of a container, the intermediate wall 23 engages the internal surface of the container neck.

The top wall 18 of the compartment 16 has an outwardly extending rim 26 with a reversely angled shoulder 27 to engage a corresponding shoulder on the upper peripheral edge of the closure body 21. Thus, the compartment 16 and closure body 21 15 are snapped into engagement by the inter-engagement of the respective shoulders. The engagement, however, is sufficiently free that the compartment 16 is able to rotate relative to the closure body 21 about the axis of the closure 15.

A lower edge of the intermediate wall 23 carries an inwardly extending flange 28. At one point around the flange 28, a cutting blade extends upwardly from the inner 20 edge of the flange 28 towards the top wall 18 of the compartment 16. The blade 31 is spaced from the intermediate wall 23 by a distance that is slightly greater than the thickness of the side wall 17.

When the compartment 16 is assembled with the closure body 21, the blade 31 is located at that portion of the side wall 17 having the least extent so that the blade 31 25 does not penetrate the frangible bottom wall 19.

When the closure 15 is engaged with the neck of a container, the compartment 16 is located within the container neck. A tamper-proof evident release band 32 extends from the lower edge of the outer side wall 22 to provide evidence of tampering with the closure 15 after engagement with a container. Such tamper-proof bands are 30 known in the art and will not be described further in detail.

In use of the closure 15, when it is desired to dispense a product sealed within the compartment 16, the upper edge portion 33, which is preferably provided with a knurl, ribs or the like, is rotated relative to the closure body 21 thereby causing the angled bottom wall 19 to engage with the upper edge of the blade 31. The blade 31 35 cuts into the bottom wall 19 with continued rotation thereof thereby releasing the bottom wall 19 to enable contents of the compartment 16 to fall into the container.

The contents of the compartment 16 may be any of those referred to above or any product that is to be mixed with another within the container.

The frangible bottom wall 19 may be formed of an aluminium foil which is adhered to the lower edges of the side wall 17. Alternatively, the frangible bottom wall

5 19 may be formed of the same material as the side wall 17, or any other suitable material for sealing contents within the compartment 16.

Referring to Figure 2, this embodiment is similar to that shown in Figure 1 except that the compartment 16 is formed integral with the outer side wall 22. In this embodiment, a cylindrical band 34 is a snap-fit over the outer surface of the

10 compartment side wall 17, which is formed with an appropriate groove 35. The cylindrical band 34 carries the inwardly extending flange 28 and the cutting blade 31.

In use of the closure of this embodiment, the cylindrical band frictionally engages the inner surface of the container neck thereby holding the band against rotation during rotational movement of the compartment 16. The outer side wall 22

15 may be formed with threads, as described previously, or is provided with ribs, ridges or the like which enable the closure to be snap-fitted to the neck of a container.

In the event that threads are used, an internal groove and stop shoulder may be used so that the compartment 16 is able to be rotated relative to the cylindrical band 34 in one direction only, the shoulder preventing rotation in the opposite direction. This,

20 then, enables the cap to be screwed onto a container neck without relative rotation occurring, but reverse relative rotation will cause the compartment 16 to rotate relative to the blade 31 thereby causing the blade to cut into the frangible bottom wall 19 to release the contents of the compartment.

Referring to Figure 3, this embodiment is similar to that of Figure 1 in which a

25 separate compartment 16 and separate closure body 21 are utilised, the parts being fitted together through inter-engaging shoulders 27.

In this embodiment, the bottom wall 19 extends in a plane perpendicular to the axis of the closure 15. The cutting blade 31 is contained in a protective pocket 36 formed at one side of the side wall 17. Relative rotation between the compartment 16

30 and the closure body 21 causes the cutting knife to jump out of the protective pocket thereby causing the knife to pierce and cut through the frangible bottom wall 19 releasing the contents of the container.

The cutting knife, which is shown in both side and front views in Figure 3 for clarity, has two cutting edges 37 angled away from each other which ensures that the

35 knife is able to cut irrespective of the direction of relative rotation.

Referring to Figure 4, this embodiment is similar to that of Figure 2 but incorporating the bottom wall and knife construction of Figure 3.

The cutting blade 31 of this and the previous embodiment has a third cutting edge 38 which is substantially parallel to the first cutting edge. It has been found, in  
5 use, that when the compartment 16 is rotated relative to the cylindrical band 34 in a direction that moves the cutting blade 31 illustrated towards the right, the action of cutting also causes the cut bottom wall 19 to peel downwardly thereby facilitating release of contents of the compartment into the container to which the closure 15 is fitted.

10 Referring to Figure 5, a modified construction of closure is illustrated in which the compartment 16 is defined by the side walls 17, which fit closely within the container neck, and a separate top wall 18 that is attached to the side wall 17 by the inter-engaging shoulders 27. In this embodiment, the cutting blade 31 is disposed on the end of a downwardly extending carrier 39. The compartment 16 is thus formed of  
15 separate parts snap-fitted together, and is particularly suitable for a product which is unaffected by the atmosphere.

A shoulder 41 is provided at the upper edge of the side wall 17 at that part of the side wall of least extent to restrict relative rotation of the blade carrier 39 so that the bottom wall 19 is not completely severed from its engagement with the side wall 17.

20 As with all other embodiments, the outer side wall 22 may be provided with internal screw threads or snap-fitting ribs or ridges or the like for engagement with a correspondingly shaped neck of the container to which the closure is to be fitted.

Referring to Figure 6, this embodiment is similar to that of Figure 5 except that the outer side wall 22 is formed integral with the top wall 18 and is snap-fitted to the  
25 side wall 17 of the compartment 16 using the inter-engaging shoulders 27.

The side wall 17 is formed with an annular enlargement 40 on its outer surface that tightly engages against the inside surface of the container neck. The enlargement 40 holds the side wall 17, and the bottom wall 19, against rotation relative to the container neck when the outer wall 18, and the integral blade carrier 39, is rotated  
30 thereby enabling the blade 31 to cut through the bottom wall 19.

Referring to Figure 7, this embodiment is similar to that of Figure 3. However, in this embodiment, the rim 26 of the top wall 18 is provided with a tamper proof evident band 42 which extends from the outer edge of the top wall to engage with the upper edge of the outer side wall 22. The inter-engaging shoulders 27 are separated,  
35 and the cutting blade 31, carried by the flange 28 is spaced from the frangible bottom wall 19. In this embodiment, there is no protective pocket for the cutting blade 31.

The contents of the compartment 16 are released, in this embodiment, by removal of the tamper proof evident band 42 thereby permitting the compartment 16 to be snap-engaged with the closure body 21 by relative axial movement. Such movement causes the cutting blade 31 to cut into the frangible bottom wall 19 whereupon relative rotation of the respective compartment and closure body 21 causes the cutting blade to break open the bottom wall 19 to release the contents of the compartment 16.

Referring to Figure 8, the dispensing closure of this embodiment is designed particularly for use on models having a threaded neck, such as a beverage bottle or the like. The closure comprises a compartment 16 having a side wall 17 and a bottom wall 19 formed of a frangible membrane which extends from the lower edges of the intermediate wall 23. Thus, the compartment 16 is only sealed when the side wall 17 is engaged with the closure body 21.

The peripheral edge of the top wall 18 is formed with a groove 43 to receive a rib 44 extending from the closure body 21. A cutting blade 31 extends downwardly from the side wall 17 so that, on relative axial movement between the top wall 18 and integral side wall 17 and the closure body 21, the cutting blade 31 pierces the membrane forming the bottom wall 19 thereby permitting contents of the compartment to be dispensed into the container.

If desired, means for relatively rotating the side and top walls relative to the body 21 may be provided on the top wall 18 to facilitate further cutting and removal of the bottom wall or membrane 19.

Referring to Figure 9, this embodiment is similar to that of Figure 1 except that the top wall is formed with a release valve 46 which allows contents of the container, when mixed with the contents of the compartment 16, to be withdrawn from the container through the valve 46.

The release valve, which is known per se and will not be described in great detail, is maintained in a sealed condition by a cap or shrink wrap or other sealing means to minimise the possibility of actuating the valve before the relative rotation of the compartment 16 and closure body 21 to release the content of the compartment into the container. However, once the contents have been mixed, and the cap, shrink wrap or other sealing means is removed, the release valve 46 is able to be used to remove contents from the container. The outer portion of the release valve is moved upwardly, relative to the position shown in Figure 9, to open the valve and permit extraction of the container contents.

Referring to Figure 10, the compartments described and illustrated with reference to Figures 1 to 9, may contain a single product to be dispensed into a container which, in one example, may hold a beverage or the like. However, the compartment 16 may be divided into two parts by a dividing wall 47 thereby enabling 5 two products to be dispensed from the dispensing closure 15. Thus, the contents of a twin compartment 16 may be dispensed as alternate products or sequentially to dispense both products.

Referring to Figure 11, a compartment may be divided into three or more chambers by partitions 48. This allows three substances to be dispensed by causing 10 relative rotation of the compartment 16 and the closure body 21 so that the cutting knife cuts through the frangible bottom wall 19 until it reaches a petition 48 at which it then jumps across the petition wall into the next compartment as rotation is continued. The top wall 18 of the compartments 16 may be appropriately marked to indicate the contents thereof so that selections may be made in dispensing those contents. Thus, 15 one compartment may contain a beverage mix, such as coffee, while another compartment contains sugar granules and a third compartment contains a creamer.

Referring to Figure 12, there is illustrated one embodiment of a cutting blade 31 for use in the performance of the invention. The cutting blade 31 is preferably formed by moulding of the same material as is used in the construction of the compartment 16 20 and/or the closure body 21. The blade 31 is moulded integrally with the respective wall parts of the closure 15. The blade 31 is specifically designed to first cut through the frangible bottom wall 19, which may be a membrane formed of synthetic plastics material, aluminium foil or any other suitable material used as the frangible bottom wall 19. The blade includes a first cutting edge 51, a second edge 52 and a third cutting 25 edge 53. In use, with the wall 19 moving in the direction of arrow "a" relative to the blade 31, the first cutting edge 51 cuts into the wall 19. As the relative position of the wall changes, due to the angle between the wall 19 and the plane perpendicular to the rotational axis, the wall moves axially relative to the cutting edge 51 until it reaches the third cutting edge 53. Continued relative movement results in the membrane material 30 being peeled back from the opening formed by the cutting blade 31 so that the bottom wall 19 is peeled away from its engagement with the respective compartment wall thereby permitting compartment contents to fall into the container without hindrance by the bottom wall 19. Embodiments of the invention will be designed so that the bottom wall 19 is not completely removed from its attachment to the respective compartment 35 wall so as not to fall into the container. Thus, a stop or other means may be provided to

reduce the likelihood of the bottom wall 19 being completely removed and falling onto the container.

By having a cutting blade 31 formed with opposing edges as illustrated in Figure 12, the direction of relative rotation is irrelevant as either side, or leg, of the 5 blade able to be used depending on the direction of relative rotation..

Referring to Figure 13 there is illustrated a closure 15 which may have similar features to those shown in Figures 1, 3 and 5. It will be appreciated that it is important, when assembling the compartment 16 with the closure body 21 that the parts are properly aligned so that the cutting blade 31 is appropriately located in a position which 10 does not cause it to cut into the bottom wall 19 prior to intended use. Figure 13 illustrates one construction for ensuring proper alignment. In this arrangement, the closure body 21 is provided with an upstanding peg 54 which is received within a corresponding groove 56 in the edge of the top wall 18 of the compartment 16. The peg 54 acts as a further tamper proof evident device as it must be folded outwardly 15 away from the groove 56 before relative rotational movement is able to take place between the compartment 16 and closure body 21. The action of folding the peg 54 outwardly away from the groove 56 causes it to tear along its junction with the closure body 21.

It will be appreciated that other forms of alignment guides may be used to 20 ensure the parts of the closure 15 are properly aligned when assembled.

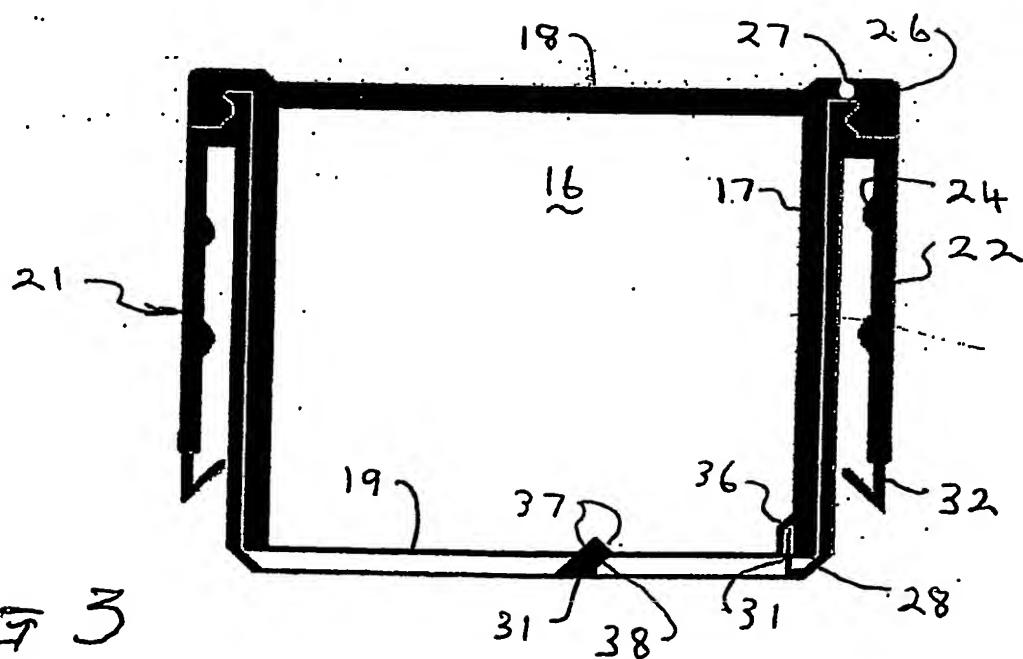
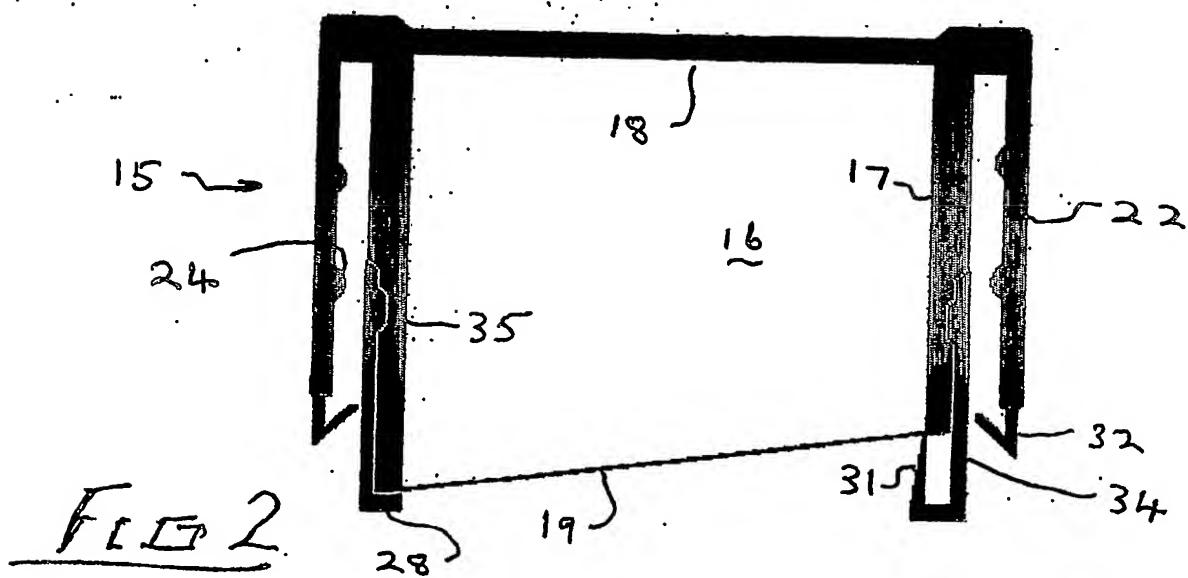
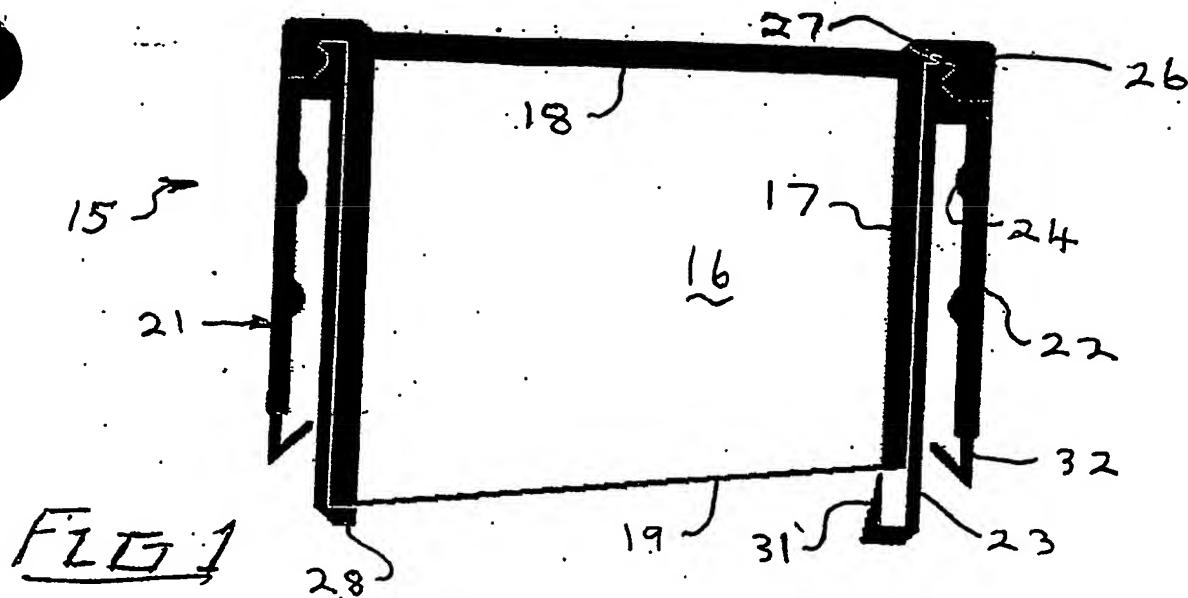
It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as 25 illustrative and not restrictive.

Dated this ninth day of September 2003

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F B RICE & CO



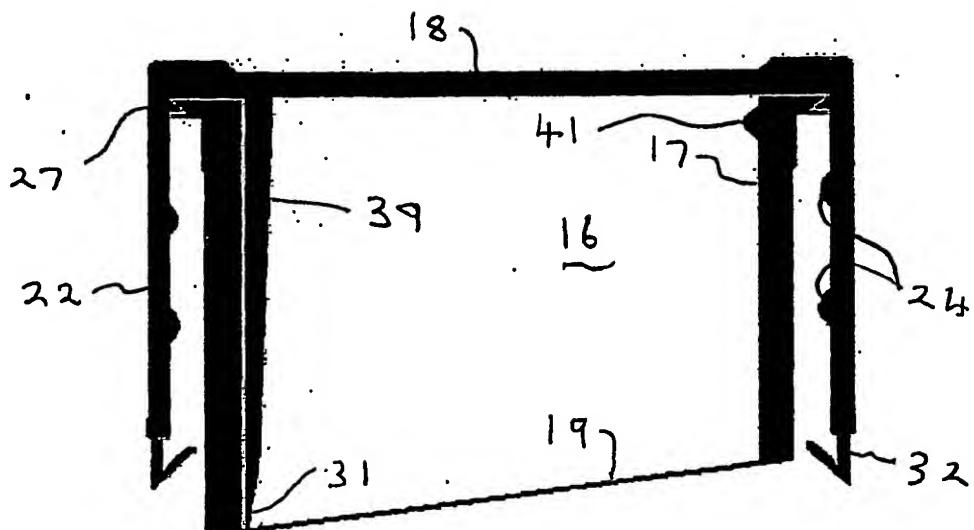
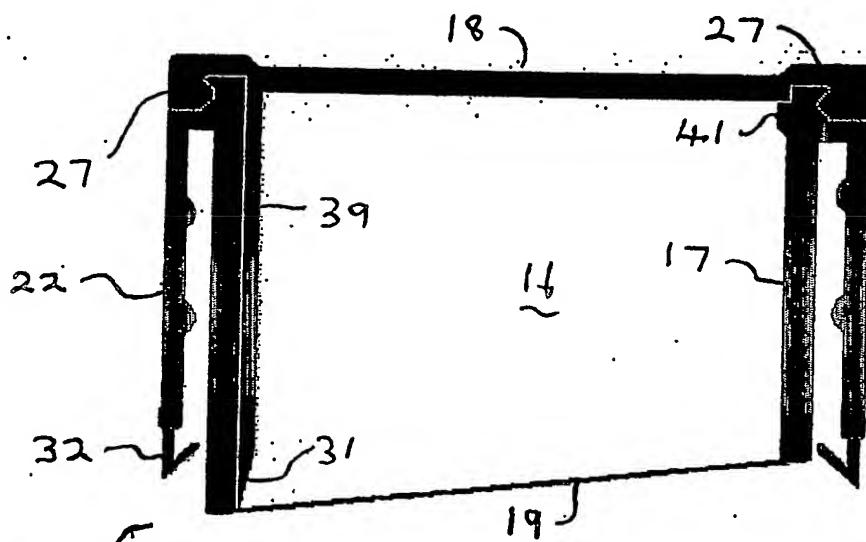
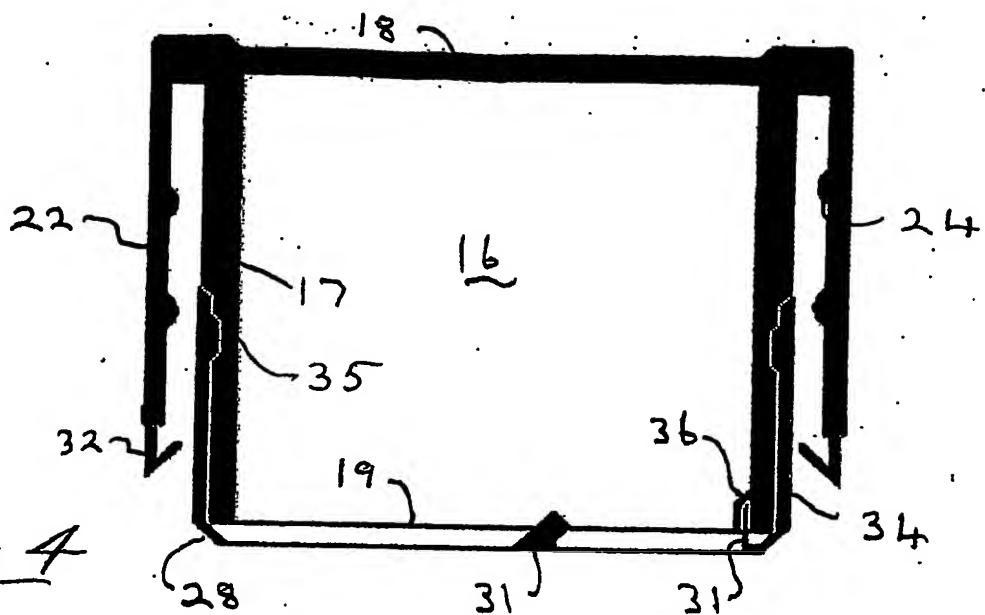


FIG 7

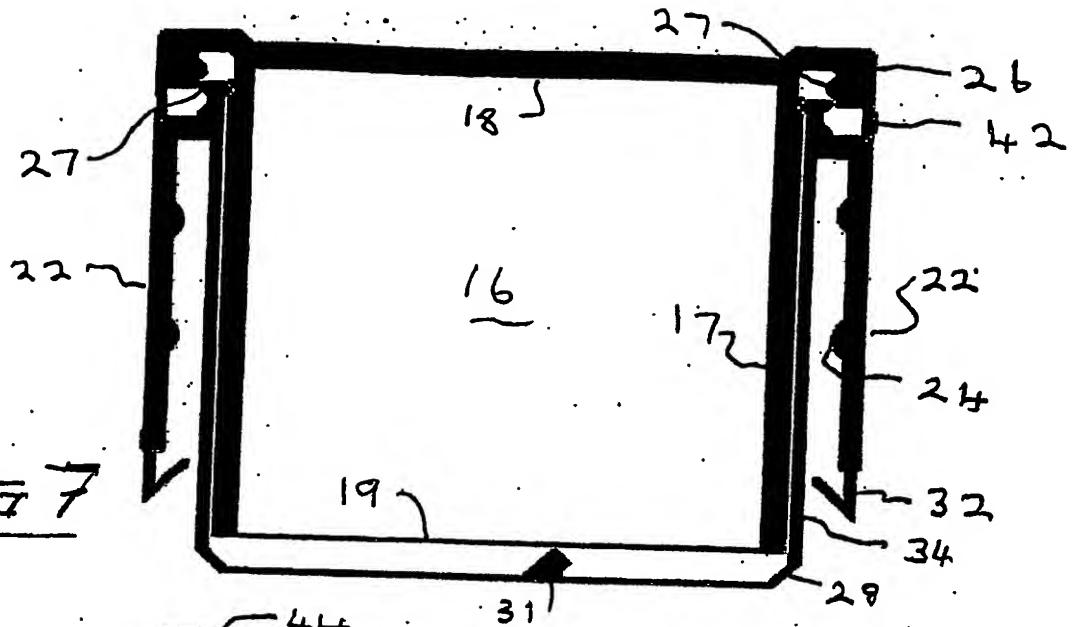


FIG 8

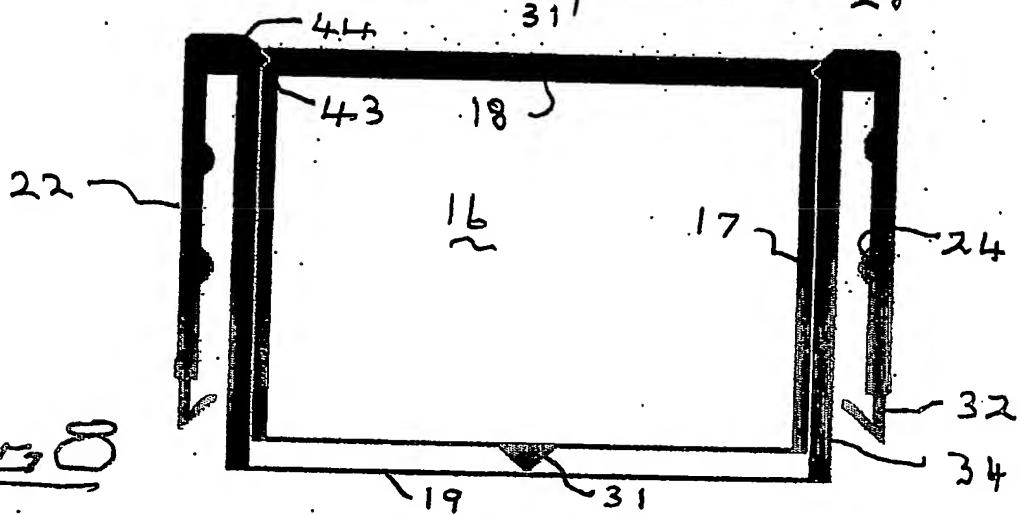
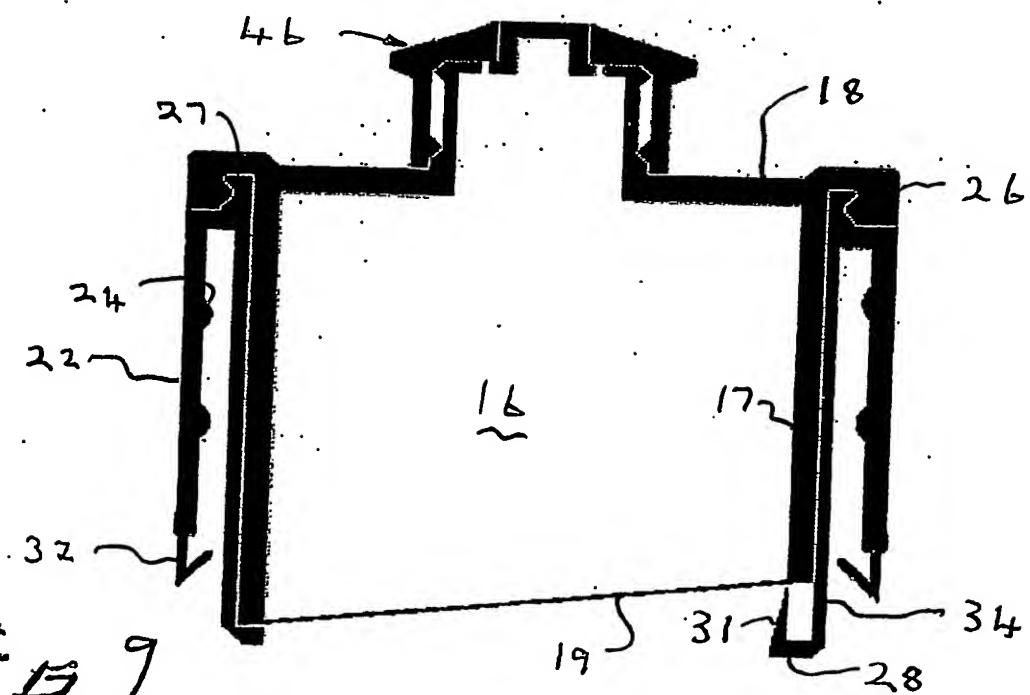


FIG 9



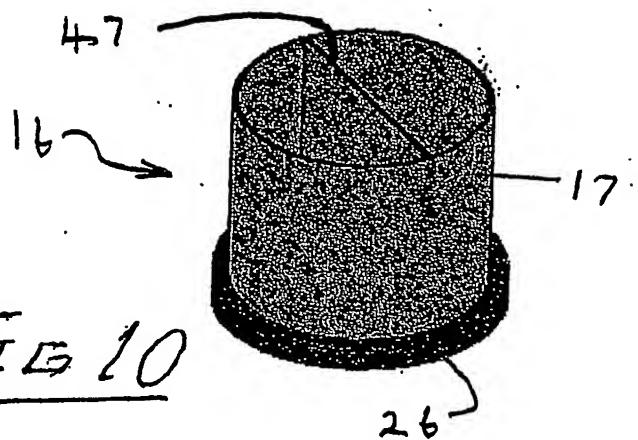


FIG 10

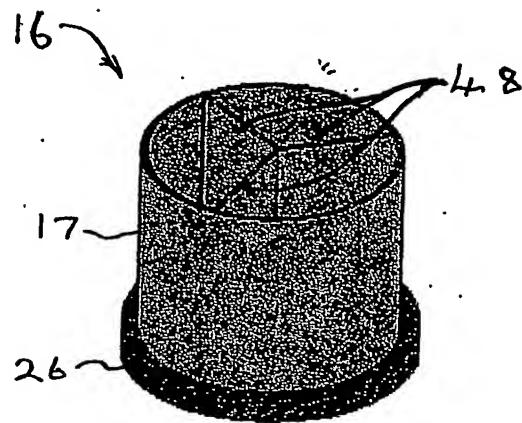


FIG 11

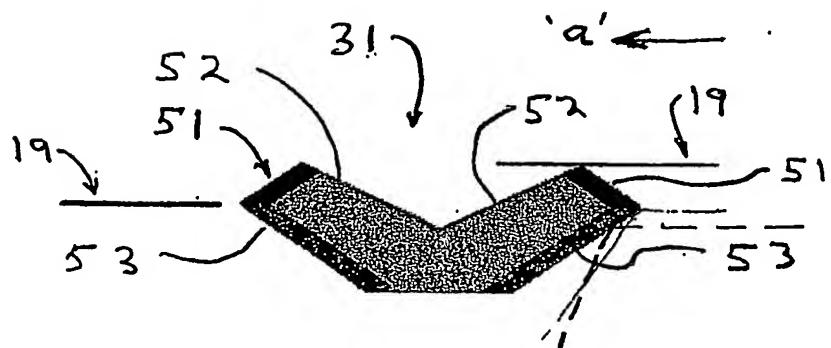


FIG 12

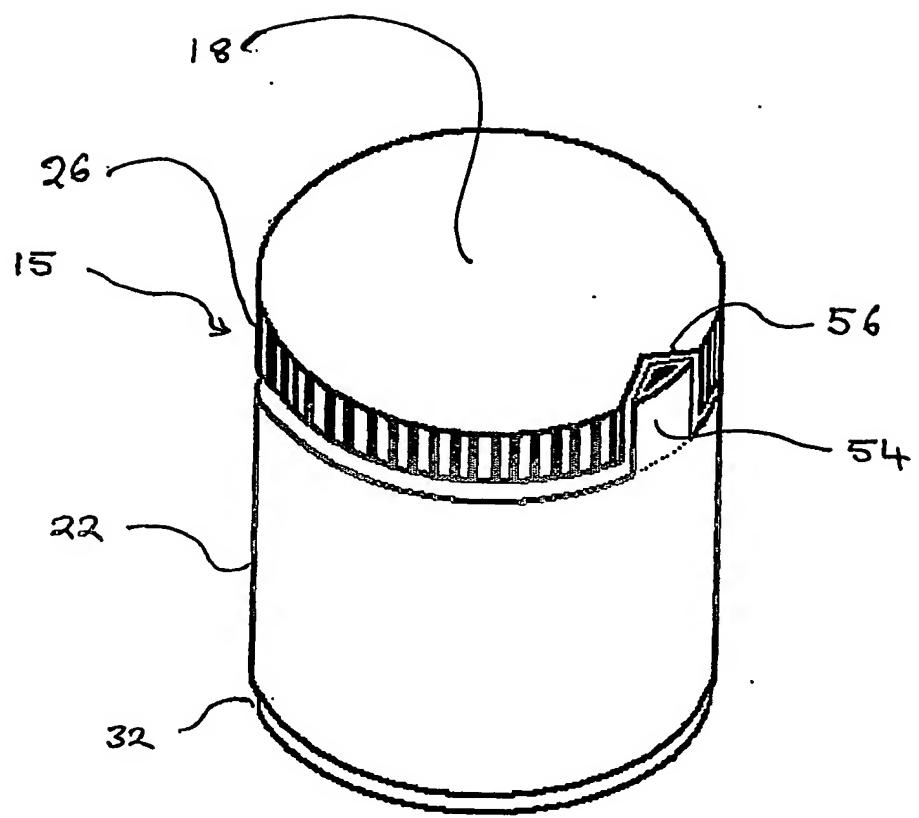


FIG 13

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